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Campfires on the plateau are not banked at night, but heaped with sufficient wood to last until morning. 372

Ladles. These are said to be made of mountain sheep horn (*mukwe-vilt*) alone, although Cushing saw small wooden ladles.[1] The typical ladle (*mukwa'*) has a round, shallow bowl, 12 cm. in diameter, with a curved handle. A smaller dipper, 15 cm. long, has an oval bowl with a short handle (20ab). After the handle is hacked and trimmed to size, the horn is soaked and buried in wet sand from three to six nights or until it is fairly soft. The grease of the mountain sheep and the mountain lion are rubbed into the horn, which is warmed at the fire. The handle is then bent into shape. To form the bowl, the top of the horn is split, 321 415

Fig. 20 *a* (50.2-1585), *b* (50.2-1217). Mountain Sheep Horn Ladles.

the sides wedged apart with a stick, and the edges trimmed. The bowl is filled with dirt, carefully propped up, and laid aside for a week to harden. As these are used to serve hot liquids, the bowl relaxes to its original shape. The Hopi, who take these ladles in trade, cut disks from them, which they flatten and bore for spindle whorls.[2] [439]

Gourds. Gourds (*á'ndle*), grown in the canyon, are infrequently used as water vessels. These are a long-necked variety, 25 cm. or less in diameter. The stem end of the neck is cut off square and stoppered with grass, crushed cedarbark, or a corncob.[3] A handful of kernels is placed in the new gourd and given an occasional shake to remove the loose fibers. 415

[1] Cushing, (a), 880.
Such ladles are widely distributed: Hopi and all other pueblos (Hough, (a), 276); Paiute examples in the Peabody Museum, Salem, Mass.; Wind River Shoshoni (Lowie, (b), 89). [171]
[2] The Mohave use similar gourds to carry grain on journeys (specimen in Museum of Anthropology, University of California).

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411 other at the forward end. These are hung up to dry.) The sinew is
237 soaked in water over night, scraped with the back of a knife, and separated into fibers when partly dry. To make the bowstring, two bundles of these are rolled together between palm and thigh, new lengths being added by rolling in as needed. Three bundles were preferable; these were rolled together, never braided. The bowstring is tied permanently to the upper end; the hitch for the lower end is shown in Fig. 24a. This
[556] is a poor man's style; a rich man would tie a length of buckskin to the loose end and continue the wrapping for another 5 cm., fastening with a
411 half-hitch. To string the bow its upper end is set under the right instep, and while the lower end rests in the left hand, the bow is sprung by pressing with the left knee; then the right hand fastens the string. When strung, the spring of the bow is tried, and a song to the bow and string is chanted: hàpûsagwîpâ (Let this be
[788] strong; let this not break).

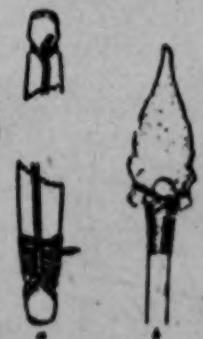

Fig. 24 (89.5-1221, 1223). a, Ties for Bowstring; b, Method of securing Arrowhead to Shaft.

The wrist protector (*saldmî*) is simply a broad band of buckskin encircling the wrist, somewhat trimmed to fit the heel of the hand. It is fastened by taking up the slack in a loop which passes through both ends of the band.

Boys sometimes use small bows of men's type but the normal boy's bow is D-shaped. One in the collection measures 60 cm. from tip to tip, the chord of the arc 25 cm.; another 65 by 25 cm. Boys use only reed arrows, with sharpened foreshafts, and feathered with the plumage of the hawk, flicker, etc.

411 Reed arrows (*áp'a"dî'a'* or *dî'a"áp'ad'a*; *áp'a"a*, arrow) are most
322 common. Arrow reeds (*dî'd'*) are gathered green. In order to straighten them, the crooked part is pressed on hot ashes placed on a flat stone, or in the groove of an arrow-straightener (*áeêûed*). Stones are also heated in the fire for this purpose.[1] The joints are then trimmed. Wooden arrows (*áp'd'a'i'i; i'i*, wood) are made of an especially hard willow (*ámaedîá*, probably desert willow). These branches were peeled and left in the sun until partially dry when they could be straightened with a wrench, never by heating. The wrench (*mâkwapadjîá mâdêmidîá*) is
[321] a mountain sheep shoulder blade or horn in which several holes have
[412] been drilled.

[1] The shaft is not wet with the tongue at the point to be heated as the White Mountain Apache do.

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been drilled. Straightness is determined by sighting. The arrows are next cut to proper length; for use with the self bow, from tip of forefinger to top of biceps; for the sinew-backed bow, from tip of middle finger to bottom of biceps. (This may apply to wooden arrows only). Reed arrows in the collection measure 75 to 76 cm., of which 15 cm. is foreshaft; willow arrows, 70 to 73 cm.; and boys' reed arrows, 72 to 77 cm. with 9 to 12 cm. foreshafts. Willow shafts are trimmed with a knife which like all knife movements is toward the body—and then rubbed between two grooved gritstones (*patamdlia*) of pumice held in the hand. The shaft is a true cylinder of the diameter of arrow reeds except for a slimmer section where the feathers will be bound and for a flare at the nock. The nock (*padjatañiga*) is next cut; in a reed arrow this comes just above a joint. The foreshaft for the reed arrow is also willow, trimmed to size, about 15 to 20 cm. long, and pointed at both ends. After this is painted red, it is glued into the pith channel of the reed. The end of the shaft is then wrapped for 2 to 3 cm. with sinew, fastened with glue, to prevent it splitting. Finally the foreshaft is split to receive the arrowhead, which is set in the mouth, glued in, and tied on with sinew, which is not, however, glued (Fig. 24b). It is prayed to that it may stay tight. Many arrows, used for small game, have simply a sharpened foreshaft.

Stone arrowheads range from 3 to 6 cm. in length; the smaller are placed on reed arrows, the larger on wooden shafts. These are triangular, with a deep, square notch in the base, and with the cutting edges reaching almost to the base. If an arrowhead tends to work loose, it is nicked well up the side to aid in retying. Stone heads were flaked on the heel of the hand with an antler tip cylinder. Bone or antler arrowheads are not used. Blunt points for stunning small game are not manufactured, but a corncob may be placed on the point of the foreshaft for this purpose.[1]

Willow arrows are often decorated with one to three zigzag or wavy grooves (*dpdcd'ui'ga*) running the length of the shaft, representing lightning (*vtlal'djd*). These are made with a tool consisting of a wooden block with a groove across one face into which there protrudes the point of a knife thrust through from the back. The shaft is drawn through the groove, rocking it slightly, so that the point may trace a sinuous line.

The eagle and hawk furnish the best feathers for arrows, those of a smaller blue and gray hawk and possibly other birds are also used. Young

[1] It is curious that the metal points that are made have the arms of rounded shoulders where the long joins the blade which occur in early trade examples found in use on United States

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tions) at hand are: Maidu, 1 m., Salinan, 91 cm., Havasupai, 91 to 112, Western Apache, 162, Yavapai, 137, Mohave, 122 to 182, Pima, 135, Cahuilla, 122 to 137, Luiseño, 152, Southern Diegueño, 100 to 120, Cocopa, 183 to 243, Pipi[1] and Lower California Indians, 182, and Pericues, "long."[2] The exception here is the Southern Diegueño.

Mohave, Navaho, and Southern Diegueño bows at least are cut from the wood in the same way as the Havasupai. That is, the rounded back of the bow is the exterior of the tree limb, the interior is cut flat giving a trapezoidal cross-section. This may not be general.[3]

The Navaho use the same bowstring hitches as the Havasupai and also attach a length of buckskin to the string. The bowguard or wrist protector is widely used. In this area it is recorded for the Yavapai, Tonto, Havasupai, Navaho, Hopi, Mohave, Pima, Southern Diegueño, Paviotso, and Northern Shoshoni.[4]

The arrow wrench may be quite widely used. O. T. Mason ascribes it to the Plains Indians, the West Coast tribes, and the Eskimo. I have found it recorded among the Navaho, Ute, and Cheyenne,[5] as well as the Havasupai. This is a mountain sheep horn. The Hopi use antelope or goat horn[6]; the Cheyenne bone also.

Reed arrows are apparently restricted in the Southwest and California to the tribes in the direction of the lower Colorado River. The Yavapai, Tonto, Pima, Cocopa, Pipi, Seri, and the Indians of Baja California seem to use only reed arrows[7]; wooden ones are also used by the Navaho, Havasupai, Western and Mescalero Apache, Mohave, Yuma, Cahuilla, Panamint, Luiseño, Southern Diegueño, and Maidu.[8] All other tribes mentioned in the second paragraph below apparently have wooden arrows only. The Havasupai and Luiseño favor the reed, the Cahuilla the wooden arrow. It is interesting that the Paviotso make a wooden arrow with a separate foreshaft in the manner of a reed arrow.[9]

There is also a suggestion that arrows from the lower Colorado and Baja California are longer than elsewhere. This might be expected from

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[1] A group one hundred miles below the mouth of the Gila and below the Cocopa (Pattie, 201).

[2] Dixon, (a), 322; Mason, J. A., (a), 162; Fourbo, (b), 57; Whipple, Eubank, and Turner, 30; Russell, (d), 98; Kroeber, (g), 86; Sparkman, 206; Spier, (c), 330; Chittenden, 204; Bancroft, 362; North, 238.

[3] Pope, 234, Pl. 46, Fig. 2; 237, Pl. 47, Fig. 7; Spier, (c), 330.

[4] Corbusier, 292; Bourke, 418; Shufeldt, (a), 734; Franciscan Fathers, 319; Hough, (a), 240, 295; Whipple, 134; Russell, (d), 100; Spier, (d), 352; Lowie, (i), 245, (a), 192.

[5] Franciscan Fathers, 318; Mason, O. T., (f), 660; Grinnell, (b), I, 179.

[6] Hough, (a), 276.

[7] Whipple, 96; Bourke, 418; Russell, (d), 98; Heintzelman, 43; Pattie, 201; McGee, 197, Bancroft, 362; North, 238.

[8] Franciscan Fathers, 182, 318; Mason, O. T., (f), 639, 661; Pattie, 164; Trippel, 376; Kroeber, (d), 86; Coville, 269; Sparkman, 206, 208; Spier, (d), 351; Dixon, (a), 322.

[9] Lowie, (i), 245.

Hilliff Y-8 (ca. 1901) 1954 NT14 Plateau Yumans NT14
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from the bed of hot coals. Broken pieces of stone always had to be picked from the food. So these cumbersome vessels were discarded as soon as other containers were available. But the horn spoon, shaped from the horn of mountain sheep, was still in use. Making it was a tedious and lengthy process. The horn was soaked in water, then buried in moist sand until somewhat softened. The next steps —heating, oiling and fashioning the horn into a spoon or ladle— required the skill of long practice. Tin cups, obtained at the trader's store in Seligman, were gradually supplanting the horn spoon, and another skill would soon be forgotten.

In a report on conditions in the canyon for the year 1898, the acreage in cultivation and under fence was estimated at three hundred twenty-five. One thousand bushels of corn and fifty bushels of wheat were grown that year, in addition to an abundance of vegetables and fruits. And the tribe had a cash income of four thousand dollars. At that time, tribal affairs were managed almost wholly by the chief and head men, although the school had been in operation for three years. From the seeds their gods had given them, the Havasupai had reaped their independence.

They preferred their old system of barter and trade to a cash sale. The Navaho were silversmiths and weavers of warm blankets, while the friendly Hopi and Walapai had ponies or goods to trade. A Havasupai could measure out a small tray of beans and—after endless good-natured bargaining—exchange his beans for a fine Navaho blanket. Two spirals of their dried pumpkin or squash had the same value.

Every man of consequence kept a pony in his dooryard and sprang to its back to ride the short distance to a neighbor's wickiup. So horses were eagerly sought. A Hopi pony cost a large well-tanned buckskin or as much shelled corn as a large burden blanket could hold. A man traded, or made gifts, for the girl he wished to marry, presenting her parents with ponies, blankets or grain to the value of about twenty dollars, if the girl was popular. Ten dollars in trade was a fair price for a lazy girl.

The men, of necessity, had developed skills. The tribe needed to

/100 cont./ LIKE THE PIGS, THEIR
177 peaches and apricots were derived from the whites, but so long
245 ago that they are now regarded as native.

291 The aboriginal dress of the Havasupai was simple and rather distinctive. The one arbitrary garment for the men was, of course, the breech-cloth, all additions to which were an
[554] evidence of wealth and position. For the Havasupai shirt the foundation was a large deerskin with a hole cut in the middle, like a poncho. This was loosely fastened together at the sides and held close to the body with a belt. Stitched to it were loose, baggy sleeves, open under the arms as far as the elbows. Shoulder, sleeve, and side seams were freely decorated with deerskin fringe. The leggings, close fitting and fringed at the sides, reached to the hips and were met below with high-topped moccasins. A full suit required five good-sized deerskins. The
[302] men tied their long hair in a knot at the back of the head and cut the fore part in a low bang over the eyes. The principal garment of the women, which reached a little below the knees, consisted of two deerskins sewn together at the top and sides and with openings left for head and arms. It was liberally ornamented with fringe, worn sleeveless, and belted at the waist. Their boot-legged moccasins reached to the knees. The hair, cut in a
[302] bang over the eyes, hung loose and unkempt.

285 The arts of the Havasupai are seen at their best in the
[439] basketry. Many of their tray-shaped baskets are used for barter with neighboring tribes, who know them as "Coconino." The
[415] same form, coated with earth, is used as a cooking utensil,
[251] water being boiled in them by the use of heated stones; the water bottle also is of basket-work, coated with piñon gum. A
482 coarsely woven, cone-shaped burden /101/ basket is carried on the back, supported by a strap passing across the forehead.
321 Spoons and small utensils were formerly made from mountain-
415 sheep horn.

622 Chieftainship is hereditary, the voice of the tribe determining which of the male relatives of the last incumbent is best fitted to rule. The present chief is Wimái, who succeeded Kóhat, familiarly known as "Navaho." Kóhat was considered by all who knew him to be a man of unusual strength of character, broad